REMARKS

The above amendments to the above-captioned application along with the following remarks are being submitted as a full and complete response to the Office Action dated January 23, 2008. In view of the above amendments and the following remarks, the Examiner is respectfully requested to give due reconsideration to this application, to indicate the allowability of the claims, and to pass this case to issue.

Status of the Claims

As outlined above, claims 5-6 and 8-18 stand for consideration in this application, wherein claim 12 is being amended. Claims 1-4 and 7 stand withdrawn from consideration in this application. All amendments to the application are fully supported therein. Applicants hereby submit that no new matter is being introduced into the application through the submission of this response.

Prior Art Rejections

35 U.S.C. §103(a) Rejections

Claims 5, 6, and 8-18 were rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Gronbeck (U.S. Patent No. 6,803,171). These rejections are respectfully traversed for the reasons set forth below.

Claim 5

As shown in Fig. 7, aconventional and general nonradiative dielectric line has a structure in which two conductive plates 1 and 2 approximately parallel to each other sandwich a dielectric strip 4 having a width smaller than that of the conductive plates 1 and 2, while parts 3 between the two conductive plates 1 and 2 other than the dielectric strip 4 are filled with air. Because the width of the dielectric strip 4 is smaller than the width of the conductive plates 1 and 2, and a contact area of the dielectric strip 4 with the conductive plates 1 and 2 is small, it is difficult to ensure the strength of the dielectric line. (See page 1, line 20 – page 2, line 7 of the specification)

A method as recited in claim 5 is purported to produce a dielectric line which has superior strength properties and transmission properties for high frequency signals, and is suitable for mass production. To ensure the strength of a dielectric line, the method as recited in claim 5 increases the area of the contacting dielectric material with conductive plates while

differentiating a dielectric constant of a part of the dielectric material with that of the remaining part without removing the remaining part.

In the method as recited in claim 5, a part of a dielectric raw material film formed on a conductive layer is exposed to light, beams, or vapor. Crosslinks of the material in a part of the film exposed to light, a beam or vapor are formed, while crosslinks of the material in unexposed parts of the film are not substantially formed. This causes a difference in density between the exposed part and the unexposed part. In the subsequent pore forming steps, a difference in porosity is caused between the exposed part and the unexposed part, whereby a difference in dielectric constants is caused between the exposed part and the unexposed part. Consequently, the exposed part becomes operable as a dielectric line. Because both a dielectric line, which is the exposed part, and its surrounding dielectric medium, which is the unexposed part, are filled between two conductive plates, the dielectric line is unlikely to be displaced, and strength is increased, thereby forming a stable structure.

In contrast, Gronbeck is directed to a photoimageable composition for a photoresist. Gronbeck merely states that the photoimageable composition may be used as a dielectric material, such as for interlayer dielectrics in the manufacture of integrated circuits, and a dielectric constant of a dielectric material may be lowered by incorporating pores or voids into the dielectric material. However, Gronbeck does not show or suggest explicitly or implicitly that a dielectric constant of a part of the dielectric material between conductive plates is lowered selectively, while leaving the remaining part of the dielectric material between the conductive plates. Indeed, Gronbeck says nothing about the reason to do so. Gronbeck does not show or suggest explicitly or implicitly increasing the area of contacting dielectric material with conductive plates in order to ensure the strength of a dielectric line. Applicants respectfully contend that the Examiner presents no articulated rationale to conclude that the feature as recited in claim 5, namely, exposing a part of the dielectric material, while unexposing the remaining part of the dielectric material, is obvious in view of Gronbeck. It is impermissible hindsight under 35 U.S.C. §103(a) to conclude from the above-mentioned showing of Gronbeck that a dielectric constant of a part of the dielectric material between conductive plates is lowered selectively, while leaving the remaining part of the dielectric material between the conductive plates.

Furthermore, the Examiner asserted that although Gronbeck teaches that the photoimageable composition may be developed after exposure, if the composition is not developed, the composition will remain around the dielectric strip which has been exposed,

and after the porogen has been removed, the surrounding portion will have a dielectric constant different from that of the exposed dielectric strip portion. Applicants respectfully disagree.

As set forth above, Gronbeck is directed to a photoimageable composition for a photoresist. In a photoresist, a portion exposed to light or a portion unexposed to light is dissolved by a photoresist developer to pattern integrated circuits, depending on a type of the photoresist, namely, a positive resist or a negative resist. Contrary to the Examiner's assertion, the composition of Gronbeck has to be developed, and the unexposed area has to be dissolved by a developer to pattern integrated circuits. Therefore, one of ordinary skill in the art would have developed the exposed and unexposed portions of Gronbeck's composition, because not doing so would have destroyed the operability and utility of the method shown in Gronbeck.

In sum, at the time the invention was made, one of ordinary skill in the art could not and would not achieve all the features as recited in claim 5 in view of Gronbeck. Accordingly, claim 5 is not obvious in view of the cited prior art.

Claim 12

The Examiner asserted that Gronbeck shows that the photoimageable composition can be used in a bilayer process, and if the first photoimageable composition is developed after exposure, it would have been obvious to one of ordinary skill in the art that a second film of the same or similar composition can be placed over the exposed film. Applicants strongly but respectfully disagree.

In a method as recited in claim 12, a first film is formed using a first dielectric raw material on one of two conductive plates. A part of a first film is removed and a remaining part of the first film has a shape corresponding to a dielectric strip. A second film is formed using a second dielectric raw material in a space from which the part of the first film was removed. In other words, the remaining first film and the second film are formed in the same layer to form a dielectric line between the conductive plates. Then, the entire film including the unremoved part of the first film and the second film is made porous, wherein porosity of the first film is greater than the porosity of the second film. Consequently, the dielectric strip becomes operable as a dielectric line. Because both the dielectric line and the second film are formed in the same layer between the conductive plates, the dielectric strip is unlikely to be displaced, and strength is increased, thereby forming a stable structure.

In contrast, Gronbeck merely states that the photoimageable compositions are suitable for use as a top layer in a bilayer photoresist system and is coated on a bottom layer. In other words, the two layers of Gronbeck are not in the same layer. Also, Gronbeck says nothing about replacing any part of the bottom layer with the photoimageable compositions. Therefore, Gronbeck cannot and does not show or suggest removing a part of a first film, and then forming a second film in a part of a space where a part of the film is removed.

Furthermore, the method as recited in claim 12 has substantially the same features as those of claim 5, at least with respect to making porous the film of the first dielectric raw material and the second dielectric raw material in their entirety, wherein porosity of the first film is greater than porosity of the second film. As such, the arguments set forth above are equally applicable here.

In sum, at the time the invention was made, one of ordinary skill in the art could not and would not achieve all the features of the invention as recited in claim 12 in view of Gronbeck. Accordingly, claim 12 is not obvious in view of the cited prior art.

Claims 6, 8-11, 13-18

As to dependent claims 6, 8-11, and 13-18, the arguments set forth above with respect to independent claims 5 and 12 are equally applicable here. The corresponding base claim being allowable, claims 6, 8-11, and 13-18 must also be allowable.

Conclusion

In light of the above Amendments and Remarks, Applicants respectfully request early and favorable action with regard to the present application, and a Notice of Allowance for all pending claims is earnestly solicited.

Favorable reconsideration of this application as amended is respectfully solicited. Should there be any outstanding issues requiring discussion that would further the prosecution and allowance of the above-captioned application, the Examiner is invited to contact the Applicants' undersigned representative at the address and phone number indicated below.

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